



# Management of thromboembolic events following COVID-19 vaccination

## A guide for vascular surgery

30 April 2021

This guidance is based on evolving information and may be updated as new data emerge. It complements and should be read in conjunction with the following documents by Public Health England and the Expert Hematology Panel:

- [Information for healthcare professionals on blood clotting following COVID-19 vaccination - GOV.UK \(www.gov.uk\)](https://www.gov.uk/government/guidance/information-for-healthcare-professionals-on-blood-clotting-following-covid-19-vaccination)
- [Guidance-version-13-on-management-of-thrombosis-with-thrombocytopenia-occurring-after-c-19-vaccine\\_20210407.pdf \(b-s-h.org.uk\)](https://www.bsh.org.uk/media/10407/Guidance-version-13-on-management-of-thrombosis-with-thrombocytopenia-occurring-after-c-19-vaccine_20210407.pdf)

## Definition of VITT

Vaccine induced thrombosis and thrombocytopenia (VITT) is a thromboembolic event in combination with thrombocytopenia, occurring between 5 and 30 days following COVID-19 vaccination <sup>1</sup>. VITT thromboses typically affect unusual sites. They have been mostly associated, to date, with the AstraZeneca vaccination <sup>2</sup> but has also been reported after vaccination with Pfizer, Moderna and Johnson & Johnson COVID-19 vaccines <sup>3</sup>.

## Background

COVID-19 infection is itself associated with a high risk of venous thromboembolism (VTE), with 1 in 5 patients admitted to hospital experiencing VTE complications <sup>4</sup>. This has contributed to significant vascular-related morbidity and mortality.

In contrast, VITT is a rare adverse event after COVID-19 vaccination <sup>5</sup>. Cavernous sinus thrombosis is the most common site (50%) followed by splanchnic vein thrombosis (30%) <sup>6</sup>. Arterial thrombosis and limb ischaemia have also been reported. An awareness of the condition and high index of suspicion in patients who present with limb ischaemia and have been recently vaccinated, is therefore important among vascular surgeons and related specialties.

As of 4 April 2021, a total of 169 cases of cavernous sinus thrombosis and 53 cases of splanchnic vein thrombosis had been reported via the European Union drug safety database EudraVigilance in a vaccinated population of around 34 million people by that date <sup>7</sup>. Arterial thrombotic events represent a small proportion of the cases described to date.

The syndrome affects both genders equally but may disproportionately affect younger individuals, in whom the risk of morbidity and mortality from COVID-19 infection is lower.



VITT has typically been reported after the first dose of COVID-19 vaccine but there are also reports after the second dose <sup>8</sup>.

### Typical features of the syndrome relating to vascular surgery include:

- Presentation with limb ischaemia and acute thrombo-embolic events within 5-30 days post vaccination
- An absence of other risk factors or pre-existing disease which would point to a non-vaccine related cause
- Evidence of acute arterial (+/- venous) thrombosis on duplex ultrasound and CT angiography
- Thrombocytopenia with platelets  $<150 \times 10^9/L$
- Elevated D-dimer levels above the level expected for VTE (venous thromboembolism) (probable cases  $2000-4000 \mu g/L$ ; likely cases  $>4000 \mu g/L$ )
- Low fibrinogen levels
- Antibodies to platelet factor 4 (PF4)
- Bleeding complications

### Principles of management include:

- Early recognition of the condition and involvement of haematology and other relevant teams
- Early treatment with Intravenous immunoglobulin (IVIg)
- Avoiding platelet transfusion unless surgical intervention required
- Anticoagulation with non-heparin based agents if fibrinogen is  $>1.5 \text{ g/L}$  and platelets  $>30 \times 10^9/L$
- Revascularisation of the affected limb along normal vascular surgical principles, with close liaison between relevant multi-disciplinary teams, including haematology, radiology, anaesthetics and intensive care.

### Notifications

All suspected cases should be reported to:

- The Public Health England, National Expert Haematology Panel  
<https://snapsurvey.phe.org.uk/snapwebhost/s.asp?k=161706705032>
- The MHRA Yellow Card scheme  
<https://coronavirus-yellowcard.mhra.gov.uk/>



## References

1. Expert Haematology Panel. Guidance produced from the Expert Haematology Panel (EHP) focussed on Covid-19 Vaccine Induced Thrombosis and Thrombocytopenia (VITT). 2021; [https://b-s-h.org.uk/media/19530/guidance-version-13-on-mngmt-of-thrombosis-with-thrombocytopenia-occurring-after-c-19-vaccine\\_20210407.pdf](https://b-s-h.org.uk/media/19530/guidance-version-13-on-mngmt-of-thrombosis-with-thrombocytopenia-occurring-after-c-19-vaccine_20210407.pdf).
2. Schultz NH, Sorvoll IH, Michelsen AE, et al. Thrombosis and Thrombocytopenia after ChAdOx1 nCoV-19 Vaccination. *N Engl J Med*. 2021.
3. Lee E-J, Cines DB, Gernsheimer T, et al. Thrombocytopenia following Pfizer and Moderna SARS-CoV-2 vaccination. *American Journal of Hematology*. 2021;96(5):534-537.
4. Jevnikar M, Sanchez O, Chocron R, et al. Prevalence of pulmonary embolism in patients with COVID 19 at the time of hospital admission. *Eur Respir J*. 2021.
5. Smadja DM, Yue QY, Chocron R, Sanchez O, Lillo-Le Louet A. Vaccination against COVID-19: insight from arterial and venous thrombosis occurrence using data from VigiBase. *Eur Respir J*. 2021.
6. Cines DB, Bussel JB. SARS-CoV-2 Vaccine-Induced Immune Thrombotic Thrombocytopenia. *N Engl J Med*. 2021.
7. AstraZeneca's COVID-19 vaccine: EMA finds possible link to very rare cases of unusual blood clots with low blood platelets [press release]. 07/04/2021 2021.
8. Carli G, Nichele I, Ruggeri M, Barra S, Toso A. Deep vein thrombosis (DVT) occurring shortly after the second dose of mRNA SARS-CoV-2 vaccine. *Internal and emergency medicine*. 2021;16(3):803-804.