

SUPPLEMENTARY APPENDIX

European Stroke Organization (ESO) interim expert opinion on cerebral venous thrombosis occurring after SARS-CoV-2 vaccination

Supplemental table 1 – Case series describing patients with vaccine-induced immune thrombotic thrombocytopenia associated with Cerebral Venous Thrombosis

	No. of cases (total/CVT)	Country	Age (range, years)	Sex (F:M)	ICH*	Platelet count nadir (range) x10 ⁹ /L	Anti-PF4 antibodies (ELISA) (positive/total performed)	Concomitant thromboembolic events	Outcome	Mortality
Ad26.COVS Johnson & Johnson/Janssen vaccine										
See I et al ¹	12/12	USA	<40y in 9 cases	12:0	7	9 – 127	11/11	8	ICU: 3 (25%) Non-ICU: 2 (17%) Home: 4 (33%)	3 (25%)§
ChAdOx1 nCoV-19 AstraZeneca vaccine										
Schultz et al. ²	5/4	Norway	32-54	4:1	4	10-70	5/5	Portal vein (1)	Full recovery: 2 (40%)	3 (60%)
Greinacher et al. ³	11/9¶	Germany Austria	22-49	9:2	NI	8-107	9/9	PE (2) Aortoiliac (1) Intraventricular (1) Ileofemoral (1) Vena cava (1) Microvascular (1) Multiple organs (1)	Recovering: 4 (36%)†	6 (55%)
Scully et al. ⁴	23/13	UK	21-77	13:10	3	7-113	14/15	PE (4), DVT (1), ischemic stroke (2), portal vein (2)	NI	Overall 7 (30%) CVT 4 (31%)
Tiede et al. ⁵	5/1	Germany	41-67	5:0	1	NI	5/5	Ischemic stroke (3), splanchnic vein (1) thrombotic microangiopathy (1)	Patient with CVT: comatose after cessation of sedation at the time of report (day 42)	0
Mehta et al. ⁶	2/2	UK	25-32	0:2	2	7-17	1/1	NI	None survived	2 (100%)

Ciccone et al. ⁷	11/11	Italy	32-64	9:2	10	NI	NI	PE (4); portal vein (3); suprahepatic vein (2); pelvic veins (2), aortic (1), vena cava (1), ischemic stroke (1), epigastric veins (1), mesenteric veins (1), renal infarction (1), coronary arteries (1)	Comatose: 3 (27%)¶; Significant disability: 2 (18%); No neurological deficit: 1 (9%)	5 (45%)
-----------------------------	-------	-------	-------	-----	----	----	----	---	--	---------

CVT: cerebral venous thrombosis; NI: no information; y: years; PE: pulmonary embolism; DVT: deep vein thrombosis

*In patients with cerebral venous thrombosis

§ Of note, 42% of patients were still in hospital

¥ One additional case of fatal intracerebral haemorrhage. Brain neuropathological results were pending at time of the report; CVT had not been ruled out.

† Outcome unknown in one patient

¶ By day 13, 23 and 25, respectively

References

1. See I, Su JR, Lale A, et al. US Case Reports of Cerebral Venous Sinus Thrombosis With Thrombocytopenia After Ad26.COVS Vaccination, March 2 to April 21, 2021. JAMA. Published online April 30, 2021. doi:10.1001/jama.2021.7517
2. Schultz NH, Sørvoll IH, Michelsen AE, Munthe LA, Lund-Johansen F, Ahlen MT, Wiedmann M, Aamodt AH, Skattør TH, Tjønnfjord GE, Holme PA. Thrombosis and Thrombocytopenia after ChAdOx1 nCoV-19 Vaccination. N Engl J Med. 2021 Apr 9:NEJMoa2104882. doi: 10.1056/NEJMoa2104882. Epub ahead of print
3. Greinacher A, Thiele T, Warkentin TE, Weisser K, Kyrle PA, Eichinger S. Thrombotic Thrombocytopenia after ChAdOx1 nCoV-19 Vaccination. N Engl J Med. 2021 Apr 9:NEJMoa2104840. doi: 10.1056/NEJMoa2104840. Epub ahead of print.
4. Scully M, Singh D, Lown R, Poles A, Solomon T, Levi M, Goldblatt D, Kotoucek P, Thomas W, Lester W. Pathologic Antibodies to Platelet Factor 4 after ChAdOx1 nCoV-19 Vaccination. N Engl J Med. 2021 Apr 16:NEJMoa2105385. doi: 10.1056/NEJMoa2105385
5. Tiede A, Sachs UJ, Czwalińska A, Werwitzke S, Bikker R, Krauss JK, Donnerstag FG, Weißenborn K, Höglinger GU, Maasoumy B, Wedemeyer H, Ganser A. Prothrombotic immune thrombocytopenia after COVID-19 vaccine. Blood. 2021 Apr 28:blood.2021011958. doi: 10.1182/blood.2021011958. Epub ahead of print.
6. Mehta PR, Apap Mangion S, Bengler M, Stanton BR, Czupryńska J, Arya R, Sztriha LK. Cerebral venous sinus thrombosis and thrombocytopenia after COVID-19 vaccination - A report of two UK cases. Brain Behav Immun. 2021 Apr 20:S0889-1591(21)00163-X. doi: 10.1016/j.bbi.2021.04.006.
7. Ciccone A, Zanotti B; working group on cerebral venous thrombosis after COVID-19 vaccination. The importance of recognizing cerebral venous thrombosis following anti-COVID-19 vaccination. Eur J Intern Med. 2021 May 10:S0953-6205(21)00157-6. doi: 10.1016/j.ejim.2021.05.006. Epub ahead of print.