A COVID-Positive 52-Year-Old Man Presented With Venous Thromboembolism and Disseminated Intravascular Coagulation Following Johnson & Johnson Vaccination: A Case-Study

Article in Cureus · July 2021

DOI: 10.7759/cureus.16383

2 authors, including:

Omar Shadley
Saint James School of Medicine
6 PUBLICATIONS **5** CITATIONS

SEE PROFILE

A COVID-Positive 52-Year-Old Man Presented With Venous Thromboembolism and Disseminated Intravascular Coagulation Following Johnson & Johnson Vaccination: A Case-Study

Omar Shazley MD-II, M.S.[1] Moudar Alshazley, M.D.[2]

[1]*Saint James School of Medicine, St. Vincent and the Grenadines*
[2]*Internal Medicine, Santa Rosa Medical Center, Milton, FL, USA*

**Note: This peer-reviewed case study is published by Cureus*

Introduction

- The coronavirus disease 2019 is an infectious disease caused by the SARS-CoV-2 that has resulted in increased risks of venous arterial thromboembolism. The CDC and FDA approved a nationwide distribution of the Ad.26.COV2.S vaccine manufactured by Johnson & Johnson. Use of the vaccine were halted after reported cases of cerebral venous sinus thrombosis (CVST) and thrombocytopenia (platelet count <150,000/µL of blood) among recipients.
- Researchers have postulated these rare occurrence as potential immune-triggered responses associated with complement-mediated thrombotic microangiopathy (TMA).
- Thrombotic complications and thrombocytopenia following vaccination causes inflammation to immune complexes by pro-thrombotic activation of anti-platelet antibodies.
- We present a case of venous thromboembolism (VTE) by growths of pulmonary embolism (PE) and deep vein thrombosis (DVT) with disseminated intravascular coagulation in a COVID-19 patient following the administration of the J&J vaccine.

Case Presentation

- A 52-year-old male with a history of hypertension, GERD, and NIDDM presented to the ICU with a 10-day onset of dyspnea and a dry cough. A PCR test confirmed the patient's diagnosis for COVID-19 on 4/10/21, approximately 8 days after he was exposed by a co-worker on 4/2/21. These sequences of events occurred following his administration of the Johnson & Johnson vaccine on 3/31/2.
- ECG reported regular rhythm with sinus tachycardia with no ectopy. Both PR and QRS segments and T-wave were normal with no changes to ST-wave. Patient displayed respiratory deterioration for hyperventilation with pulse oximetry of room air at 67%. Cardiac defibrillation was performed by endotracheal tube (ET) intubation. Physical exam was significant for bilateral crackle sounds with a HR at 136 bpm and RR at 40 bpm.
- The patient was started on a combination of Remdesivir, Rocephin, Zithromax and Decadron (6mg IV q 12 hours) for suspected SARS-associated pneumonia. Vaportherm was added for additional oxygenation along with normal saline 150 cc/hour for sepsis.
- Chest x-rays revealed bilateral airspace consolidations with no acute osseous abnormalities. A CT angiogram revealed a thrombus crossing the bifurcation extending into the right lobe segmental branches with a greater thrombus burden on the left pulmonary arteries and the right ventricle. Thickened ground-glass consolidations were discovered in the lungs. Doppler ultrasounds showed evidence of occlusive and non-occlusive thrombus bilaterally on the patient's lower extremity veins.
- Labs showed low levels of platelets (100,000) and fibrinogen (132 mg/dl) with elevated prothrombin time (PT) and partial-thromboplastin (PTT) at 16.4 and 37 seconds, respectively. A low pO2 of 58.30 mmHg and increased pCO2 of 40.2 mmHg puts the patient at a higher risk for respiratory failure with a low PaO2/FiO2 ratio. D-dimer level was elevated to 3.62 ug/mL.
- The patient continued to hyperventilate by the decline of O2 saturation from 90% to 76.1%. The patient was briefed on his status and was transferred upon recommendations to a nearby healthcare facility for higher-level (tertiary) care for further management. He underwent radiological intervention 2 days later to remove the clots from his lungs. The patient continued to experience worsened dyspnea with no significant improvement that resulted in his expiration.

Laboratory Data & Images

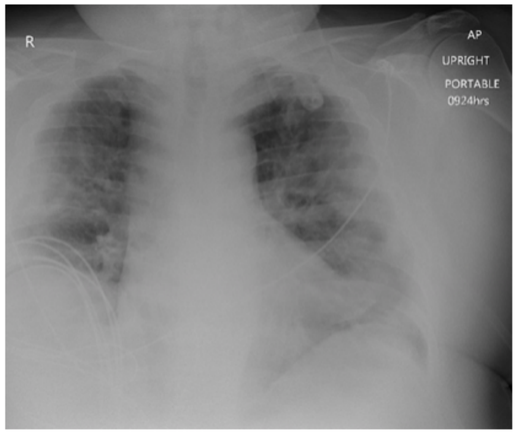

Figure 1: Patient's initial emergency department chest radiograph. Bilateral airspace consolidations with no acute osseous abnormalities are shown, a consistency found with acute respiratory distress syndrome.

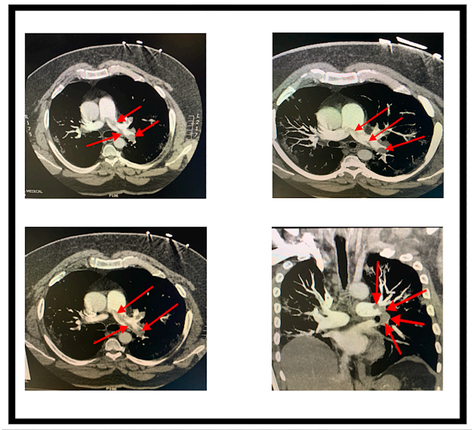

Figure 2: CT pulmonary angiography with coronal, sagittal, and maximum intensity projection (MIP) reconstructions. The images show thrombus crossing the bifurcation extending into the right upper, middle, and lower lobe segmental branches with a greater thrombus burden on the left pulmonary arteries (arrows).

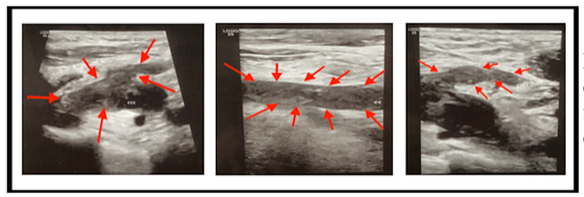

Figure 3: Ultrasound of bilateral lower extremities by Gray scale Doppler with color flow spectral broadening. These demonstrate extensive bilateral deep venous thrombosis.

Table 1. Laboratory Analysis at arrival and transfer.

	Reference Value	9:00 a.m.	4:00 p.m.
Hemoglobin (g/dl)	12.0-16.0	11.1	10.9
Platelet count (per mm3)	150,000-350,000	100,000	72,000
Leukocytes (per mm3)	4,000-10,000	17,100	18,500
Partial thromboplastin time (sec)	<35	37	45
Thrombin time (sec)	12-14	16.4	17.0
D-dimer (mg/liter)	<0.5	3.6	4.0
Fibrinogen (mg/dl)	200-400	132	95
Aspartate aminotransferase (U/liter)	<35	43	60
Alanine aminotransferase (U/liter)	<35	82	92
Glucose (mg/dL)	70-100	164	NA
Lactic acid (mmol/L)	0.5-2.2	9.0	10.3
Neutrophil (%)	45-75%	80.6%	NA
Absolute neutrophil (per mm3)	1,5000-8,000	14,100	NA
Lymphocyte (%)	15-45%	10.3%	9.8%

Table 2. Arterial Blood Gas Laboratory Analysis at arrival and transfer.

	Reference Value	9:00 a.m.	4:00 p.m.
pH	7.35-7.45	7.45	7.25
pCO2 (per mmHg)	35-45	40.2	67.6
pO2 (per mmHg)	80-100	58.3	50.8
Base excess (mmol/L)	-2 - +2	4	1
HCO3 (mmol/L)	22-26	28.2	30.0
O2 saturation (%)	93-100%	90.0%	76.1%
FiO2 (%)	100%	100%	100%
Liter Flow (per L/min)	NA	15	NA
PEEP (cmH2O)	>5	NA	5

Discussion

- A CTA revealed an enlarged right ventricle and interventricular septum consistent for right heart strain due to saddle pulmonary embolism (PE) that extended into the main pulmonary lobar segmental arteries bilaterally. Such findings contributed to his hypoxemia as a result of the SARS-CoV-2 infection.
- His elevated D-dimer and decreased fibrinogen corresponds to the findings in a retrospective study where COVID-19 positive patients in China had significantly higher concentrations of D−dimer and fibrin degradation products (Tang et al., 2020).
- Longer prothrombin time and activated partial thromboplastin time with low platelet counts were found among survivors that are consistent with classic DIC in the setting of SARS-CoV-2-induced sepsis.
- Such clinical findings strike a similarity to AstraZeneca vaccine (ChAdOx1 nCoV-19) recipients in Europe, primarily women aged 18-49 years.
- The unique abnormality points to the possible diagnosis for vaccine-induced thrombotic thrombocytopenia (VITT) following use of the J&J vaccine.
- While further research is needed to explain this manifestation, the patient's obesity was a probable factor. Obesity increases adipose tissue which enables the pathogenicity of COVID-19 by increasing pro-inflammatory response to various viral infection types. At the age of 52 with a BMI of 46.58, our patient shares similarities with the recent findings in studies that have highlighted obesity as a risk factor for COVID-19 hospitalization in patients younger than 60 years of age associated where those who are young and severely obese with a BMI ≥ 40 are 5 times more likely to die.

References

*Hales CM, Carroll MD, Fryar CD, Ogden CL: Prevalence of obesity among adults and youth: United States, 2015−2016 . NCHS Data Brief, no. 288. National Center for Health Statistics. 2017, stacks.cdc.gov/view/cdc/49223

*Harris, D: E., & Massie, M. (2019: Role of alveolar-arterial gradient in partial pressure of oxygen and PaO2/fraction of inspired oxygen ratio measurements in assessment of pulmonary dysfunction . AANA J. 87:214-221.

*Klang, Kassim, Soffer, et al.: Severe obesity as an independent risk factor for COVID−19 mortality in hospitalized patients younger. than 50. 10:1595-1599. 10.1002/oby.22913 (10.1002/oby.22913

*MacNeil, Su, Broder, et al.: Updated recommendations from the Advisory Committee on Immunization Practices for use of the Janssen (Johnson & Johnson) COVID-19 vaccine after reports of thrombosis with thrombocytopenia syndrome among vaccine recipients— United States. 2021, 70:651. 10.15585/mmwr.mm7017e4

*Merrill, Erkan, Winakur, et al.: Emerging evidence of a COVID-19 thrombotic syndrome has treatment implications . 679789785482176438 2, 1:9.

*Pai, Grill, Ivers, et al.: Vaccine-induced prothrombotic immune thrombocytopenia VIPIT following AstraZeneca COVID-19 vaccination . 10473262021021710, 10:47326. 10.47326/ocsat.2021.02.17.1.0

*Tang, N., Li, D., Wan, X. & Sun, Z: Abnormal coagulation parameters are associated with poor prognosis in patients with novel coronavirus pneumonia . J. Thromb. Haemost. 18: 844-847.. 10.1111/jth.14768