Perfect Storm: HIT, DIC and COVID-19-Associated Coagulopathy

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Introduction

Coronavirus disease 2019 (COVID-19), known for causing respiratory distress, is also associated with fibrinolysis and coagulation abnormalities in a clinical entity that has been termed COVID-19 associated coagulopathy (CAC). We present a case of CAC, complicated by heparin induced thrombocytopenia (HIT) and disseminated intravascular coagulation (DIC).

Case presentation

A 50-year-old male with PMHx of HTN and sleep apnea presented with shortness of breath secondary to COVID-19 infection.

- CRP 113 mg/L, ferritin 1444.5 mg/mL, Platelets 242 K/µL, D-dimer > 20K ng/mL, PT 14.6 seconds, INR 1.26, PTT 32 seconds.
- No bacteremia.
- On Day 6, DVT of bilateral posterior tibial and peroneal veins were found. CTA contraindicated due to AKI. Started Heparin infusion.
- 4T HIT score was 5, treatment changed from Heparin to Argatroban on Day 9.
- Platelet nadir 19 K/µL, Fibrinogen nadir 110 mg/dL, D-dimer constantly greater than 20K ng/mL. No petechiae, rash, bleeding.
- DIC ISTH score was 7, Overt DIC.
- Heparin-induced platelet antibodies (anti-PF4) and Serotonin release assays (SRA) came back Positive, confirmed HIT.
- Patient had a complex hospitalization including pneumomediastinum, pneumothorax, kidney injury and prolonged ventilator support requiring tracheostomy.
- Patient received 25 days of Argatroban.
- Patient was discharged and following outpatient setting.

Proposed CAC criteria ≥ 2 of the following:

- Platelet count < 150x10^9/L
- D-dimer > 2xULN
- PT prolonged >1s or INR>1.2
- Presence of thrombosis

**Risk factors for CAC development include elevated fibrinogen and VWF and presence of lupus anticoagulant or antiphospholipid antibodies

- CAC criteria = 4

Clinical course

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DIC

- Platelet count < 150x10^9/L
- D-dimer > 2xULN
- PT prolonged >1s or INR>1.2

Systemic activation in coagulation

- COVID-19
- Localized activation in coagulation
- CAC
- D-dimer ↑
- Prothrombin time ↑
- Presence of macro- and/or micro-thrombosis

**Risk of CAC**

one of 3): 1) fibrinogen ↑
2) D-dimer ↑
3) Prothrombin time ↑
4) Presence of macro- and/or micro-thrombosis

Consumptive coagulopathy

**DIC**

- Overt DIC criteria

References

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