

# Prophylactic Anticoagulation Treatment in COVID-19 Patients Complicated with Retroperitoneal Hemorrhage

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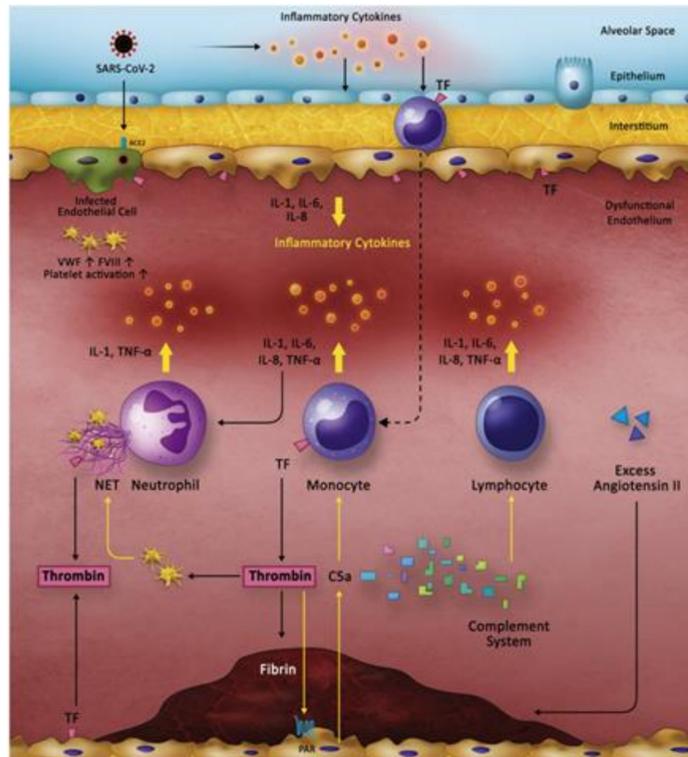
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- Three COVID cases in our facility were admitted and managed, ultimately resulting in a retroperitoneal hemorrhage.
- This complication is secondary to prophylactic treatment for venous thromboembolism (VTE) in hypercoagulable patients.

## Background

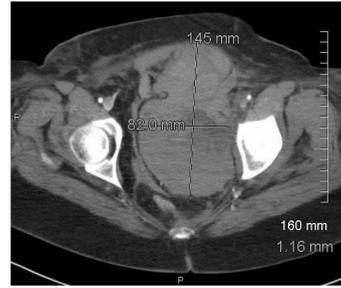
- Infection from COVID-19 increases a patient's risk of becoming hypercoagulable.
- Recent research hypothesizes a relationship between inflammation and thrombosis, and cytokine storm.<sup>1,2</sup>
- Studies report elevated incidence of VTE compared to arterial.<sup>3</sup>
- Unfractionated heparin and LMWH have been most common used as prophylaxis due to anti-inflammatory and antiviral effects.<sup>4</sup>
- Figure below shows the bidirectional crosstalk between inflammation and thrombosis.<sup>2</sup>



## Case Studies

Case #1:

- 77-year-old F admitted with shortness of breath (SOB) and COVID. Patient has undergone recent antibiotic treatment for bilateral pneumonia. Patient received Remdesivir for 5 days and Enoxaparin 80 mg subcutaneously twice daily. Patient was intubated and successfully extubated after 4 days. After 12 days, patient complained of weakness with noted hematuria in her foley bag. CT abdomen and pelvis showed a large L sided retroperitoneal hemorrhage extending into the iliopsoas, slice included to the right.



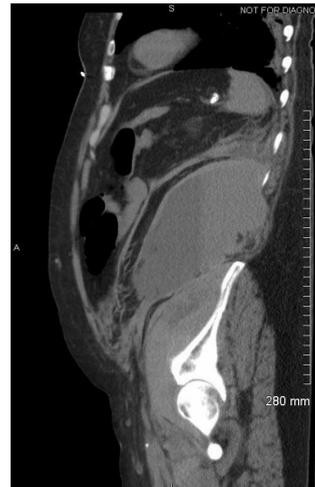
Case #2:

- 50-year-old unvaccinated M admitted to the ICU with hypoxemia and COVID. Remdesivir was infused over 5 days and Enoxaparin 110 mg subcutaneously given twice daily. By day 5, patient complained of L abdominal pain after a coughing episode. CT abdomen/pelvis showed a large R extra peritoneal hematoma in the iliac region and in the L rectus abdominal muscle, slice included to the left.



Case #3:

- 49-year-old unvaccinated F admitted with worsening SOB and COVID. Patient has a history of Rheumatoid Arthritis that is currently being treated with Tofacitinib. In addition to Remdesivir, patient also received Vancomycin and Cefepime due to her immunocompromised state. Intermediate dose of Enoxaparin 40 mg subcutaneously given twice daily was also given. Day 10, code blue was called to the patient's room and once stabilized CT abdomen/pelvis showed a large hematoma in the pelvis involving the L rectus abdominal muscle, slice included to the right.



## Discussion

- LMWH was the chosen anticoagulation in our patients due to its minimal monitoring, reduced drug-drug interactions, and reduced risk of heparin induced thrombocytopenia.
- Between the 3 of our patients, case #3 was given an intermediate dose for anticoagulation prophylaxis and cases #1 and #2 were given full therapeutic dose with similar outcome.
- Three randomized trials found that therapeutic dosing was associated with slightly lower rates of thrombosis, but bleeding was found to have a higher incidence without statistical significance.<sup>6</sup>
- Dosing for anticoagulation prophylaxis in COVID-19 patients are currently being heavily studied due to the significant balance between preventing thrombosis and preventing major hemorrhaging event.
- With each complication, quality control and assurance were looked at to maximize the best possible standard of care.
- Due to the variable results, pharmacy and the internal medicine team were brought together to discuss current guideline recommendations and plans moving forward with managing COVID-19 patients.

## Results

- Pooled analysis results found that patients treated with standard-dose thromboprophylaxis have lower rates of thrombosis compared to those not receiving any anticoagulation.<sup>5</sup>
- This analysis also found that ICU admission, obesity, presence of VTE risk factors, and elevated D-dimer were reasons physicians looked to escalate to an intermediate or therapeutic dose of LMWH or unfractionated heparin.<sup>5</sup>
  - VTE factors including elderly, immobilization, obesity, smoking

## Results (cont.)

- Rate of VTE for intermediate versus therapeutic dosing were similar, suggesting little added benefit.<sup>5</sup>
- Incidence of major hemorrhage among patients receiving therapeutic dosing was found to be greater than 6%.<sup>5</sup>
- Compared to prophylactic dosing, therapeutic dosing has a decreased incidence of minor and major thrombosis.<sup>6</sup>
- INSPIRATION trial found that escalating to intermediate dosing did not improve the outcome of thrombosis or mortality.<sup>6</sup>
  - Intermediate dosing was trending towards increased bleeding but did not reach statistical significance.<sup>6</sup>

## References

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