Venous Thromboembolism Prophylaxis in Critically Ill Patients with Coronavirus and Incidences of Thrombotic and Hemorrhagic Events (EXCITE)

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Background

- During the initial outbreak in China, experts estimated 20% of patients with COVID19 displayed a "hypercoagulable state"[1]
  - The proposed pathophysiology for hypercoagulability includes increased levels of proinflammatory cytokines, suppressed fibrinolytic systems, and endothelial damage to pulmonary capillaries[2]
- The BC Centre of Disease Control (BCCDC) recommends Enoxaparin 30mg SC twice daily for venous thromboembolism (VTE) prophylaxis as an "intermediate dose"[3]
  - This "intermediate dose" is adopted from VTE prophylaxis regimens for orthopedic surgeries and spinal injuries leading to fewer VTE events without significantly increasing bleeding events[4]
  - Patients admitted to ICU with COVID19 had an 11.7% incidence of thrombotic events[5]

Objectives

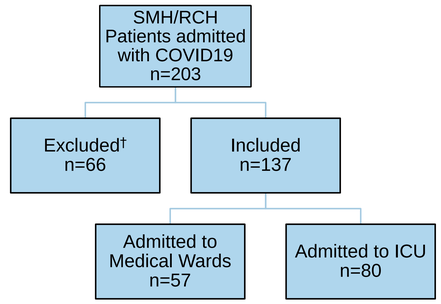
- **Primary**: To determine incidence of thrombotic events and bleeding events in patients with severe COVID19
- **Secondary**: To characterize the prevention of VTE events in patients with severe COVID19

Methods

- **Design:** Retrospective chart review
- **Inclusion Criteria:** Patients ≥ 18 years of age with positive SARS-COV2 PCR and experiencing at least one severe COVID19 pneumonia symptom :
  - (1) Respiratory rate ≥ 30 breaths/minute
  - (2) Oxygen saturation ≤ 93% breathing room air
  - (3) Alveolar oxygen partial pressure/fraction of inspiration O2 (PaO2/FiO2) ≤ 300 mmHg
- **Exclusion Criteria:** No exclusion criteria
- **Sample Size:** All patients with COVID19 admitted between January 1st, 2020 to September 30th, 2020 at Surrey Memorial Hospital and Royal Columbian Hospital
- **Primary Outcome:** New diagnosis of thrombotic events and new diagnosis of major bleeds during hospital admissions.
- **Statistical Analysis:** Simple descriptive statistics

Results

Figure 1. Patient Population

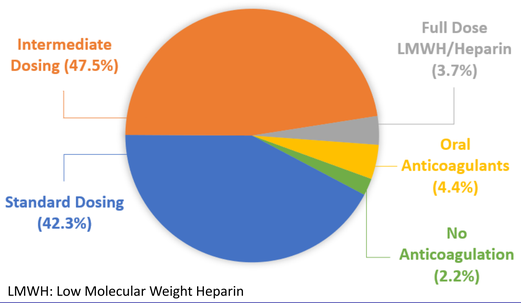


† Patients that did not fit one of the criteria for severe COVID19 pneumonia

Table 1. Characteristics

Baseline Characteristics	n = 137
Mean age, years (SD)	66.7 (± 14.2)
Male	86 (62.8%)
Comorbidities	
Previous myocardial infarction	20 (14.6%)
Atrial Fibrillation	11 (8.0%)
Diabetes	49 (35.8%)
Previous ischemic stroke, pulmonary embolism, deep vein thrombosis or other VTE	9 (6.6%)
History of major bleeding	8 (5.8%)
Medications Prior to Admission	
Corticosteroids (prior to admission)	5 (3.6%)
Corticosteroids (during admission)	44 (32.1%)
Oral Anticoagulants	11 (8.0%)
Antiplatelets	10 (7.3%)
Non-steroidal anti-inflammatories	31 (22.6%)

Figure 2. VTE Prophylaxis Regimens



LMWH: Low Molecular Weight Heparin

Figure 3. Incidence of VTE Events

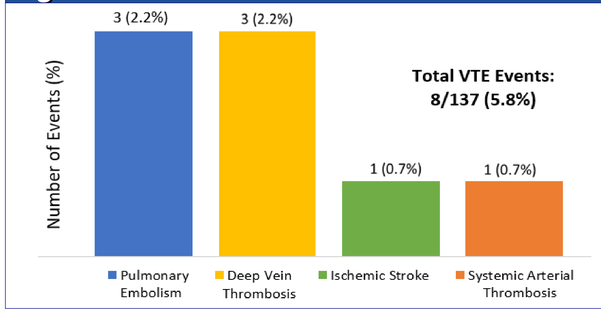


Figure 4. Incidence of Major Bleeds

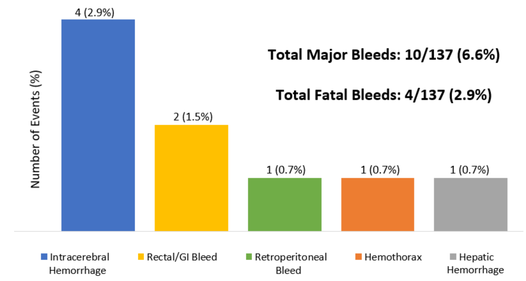


Figure 5. VTE Prophylaxis and Events

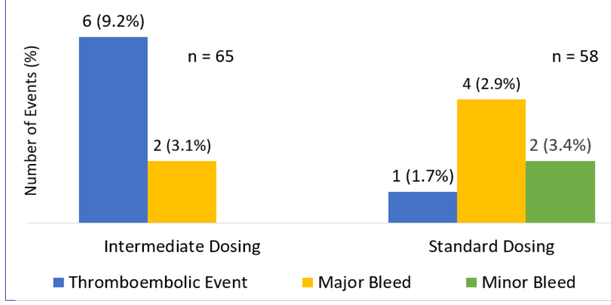
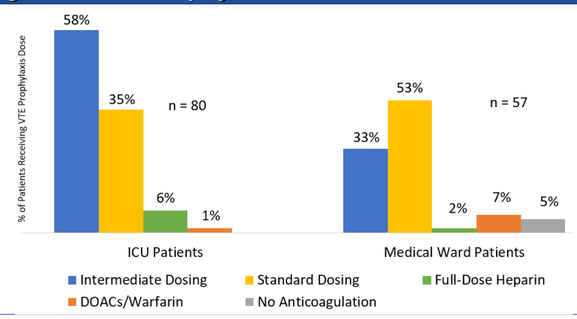


Figure 6. VTE Prophylaxis in ICU and Medical Wards



Limitations

- Retrospective chart review
- Inconsistent selection of VTE prophylaxis regimens for patients admitted with severe COVID19
- Guidelines recommending VTE prophylaxis regimens have changed throughout the course of the pandemic

Conclusions

- Patients with severe COVID19 symptoms demonstrated a 5.8% incidence of VTE events and 6.6% incidence of major bleeds
- Despite BC guidelines recommending intermediate dosing for patients admitted with COVID19, only 47.5% of patients received intermediate dosing (Enoxaparin 30mg BID or equivalents) after their confirmed diagnosis
- VTE events observed were pulmonary embolisms (2.2%), deep vein thromboses (2.2%), an ischemic stroke (0.7%) and a systemic arterial thrombosis (0.7%)
- 4 fatal bleeds and 0 fatal VTE events were observed

References

1. Zhai Z, et al. Prevention and Treatment of Venous Thromboembolism Associated with COVID19 Infection: A Consensus Statement before Guidelines. Thrombosis and Haemostasis. 2020;120(06):937-948.0
2. Iba T, et al. Coagulopathy of Coronavirus Disease 2019. Critical Care Medicine [Internet]. 2020;48(9):1358-1364.
3. Clinical Reference Group SBAR: Therapies for COVID-19. BCCDC.ca. 2020
4. Helms J, et al. High risk of thrombosis in patients with severe COVID19 infection: a multicenter prospective cohort study. Intensive Care Medicine. 2020;46(6):1089-1098.
5. Marietta M, et al. Randomized controlled trial comparing efficacy and safety of high versus low Low-Molecular Weight Heparin dosages in hospitalized patients with severe COVID-19 pneumonia and coagulopathy not requiring invasive mechanical ventilation (COVID-19 HD):Trials. 2020;21(1).

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