A Retrospective Analysis of Resource Utilization for Gastrointestinal Bleeding in Critically Ill Patients with COVID-19 Pneumonia

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Background

- During the coronavirus disease 2019 (COVID-19) pandemic, thrombosis contributed to morbidity and mortality.[1] Managing thrombosis in critically ill patients became challenging – as the usual methods of evaluation were often unavailable.[2]
- Studies report no mortality benefit for therapeutic anticoagulation with heparins for those critically ill with COVID-19.[3,4]
- We expanded beyond heparin and investigated the impact of therapeutic anticoagulation on mortality, length of stay (hospital, ICU), blood transfusions, gastroenterology consultations, and endoscopic procedures.

Objective

- To confirm that therapeutic anticoagulation in critically ill patients diagnosed with COVID-19 pneumonia is associated with increased mortality.
- To determine if therapeutic anticoagulation in critically ill patients with COVID-19 pneumonia causes an increase in resource utilization for gastrointestinal bleeding.

Methods

- This is a retrospective study conducted via chart review of 15,707 adults, with a diagnosis of COVID-19 Pneumonia, admitted to the ICU in hospitals in HCA Healthcare's West Florida Division from January 2019 to October 2021.
- **Inclusion criteria** was for patients who received either prophylactic or therapeutic anticoagulation. Patients who had a known diagnosis of DVT, Pulmonary Embolism, Atrial Fibrillation, or other condition that required therapeutic anticoagulation **were excluded** from the study. Additionally, patients who received multiple anticoagulants were excluded.
- The **primary outcome** was mortality; **secondary outcomes** include gastroenterology consultation, blood transfusions, abdominal imaging, endoscopic procedures. interventional radiology procedures, and length of stay (hospital, ICU).
- Our study used prophylactic and therapeutic doses of the following drugs: heparin, enoxaparin, dalteparin, fondaparinux, warfarin, apixaban, edoxaban, rivaroxaban, and dabigatran.
- Statistical analysis was performed by the HCA Healthcare Corporate Statistician via SAS. Linear regression, Logistic regression, and Chi-Square analyses were utilized where appropriate.

Study Population

Table A: Descriptive Statistics

Category	Subcategory	Frequency	Percent
Sex	Male	8485	54.02%
	Female	7222	45.98%
Race	Black	2471	15.73%
	Other	3448	21.95%
	White	9788	62.32%
Dose	Prophylactic	11442	72.85%
	Therapeutic	4265	27.15%

Results

- Our data revealed **statistically significant increases in mortality, LOS (hospital, ICU), blood transfusions, and gastroenterology consultations** for critically ill patients with COVID-19 pneumonia on therapeutic anticoagulation.
- Patients who only received thromboprophylaxis were 0.46 times as likely to die during admission, 0.59 times as likely to receive a gastroenterology consultation, 0.69 times as likely to receive a blood transfusion, and 0.85 times as likely to have abdominal imaging ordered. **(see Table B)**

Table B: Mortality and Resource Utilization for Prophylactic Compared to Therapeutic Anticoagulation

	Odds Ratio	95% Confidence Interval
Mortality	0.46	0.42-0.49
Gastroenterology Consultation	0.59	0.51-0.68
Abdominal Imaging	0.85	0.77-0.94
Blood Transfusions	0.69	0.64-0.75

- Linear regression showed that patients receiving prophylactic anticoagulation had a **31.4% decrease in hospital LOS** (in days) and a **33.9% decrease in ICU LOS** (in days).
- We did find an increase in the **number of endoscopic procedures** performed; however, it was not statistically significant.
- There was a decrease in the **number of interventional radiology procedures** for the therapeutic anticoagulation group. This decrease was not statistically significant.

Discussion

- Our study reported a **statistically significant increase** in **mortality, LOS (hospital, ICU), blood transfusions, and gastroenterology consultations** for critically ill patients with COVID-19 pneumonia on therapeutic anticoagulation.
- The non-statistically significant increase in endoscopic and decrease in interventional radiology procedures is likely **due to the small number of patients who received these procedures** (< 1.5% and 0.18%, respectively).
- We were **unable to capture enough datapoints to test the hypothesis that alveolar hemorrhage caused increased mortality in the therapeutic anticoagulation group** – which was raised by the REMAP-CAP, ACTIV-4a, and ATTACC Investigators.[1]
- Our data expanded on the findings of the REMAP-CAP, ACTIV-4a, and ATTACC Investigators[1] and revealed **the increase in mortality applies to all forms of therapeutic anticoagulation** – not only heparin and enoxaparin. A secondary analysis comparing the forms of anticoagulation is ongoing.

Conclusion

- Consistent with other studies, our results favor the use of prophylactic over therapeutic anticoagulation for critically ill patients with COVID-19 pneumonia – regardless of the agent.[1,2,3] This is supported by a decrease in mortality and resource utilization for patients receiving prophylactic anticoagulation.

References

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This research was supported (in whole or in part) by HCA Healthcare and/or an HCA Healthcare affiliated entity. The views expressed in this publication represent those of the author(s) and do not necessarily represent the official views of HCA Healthcare or any of its affiliated entities.

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